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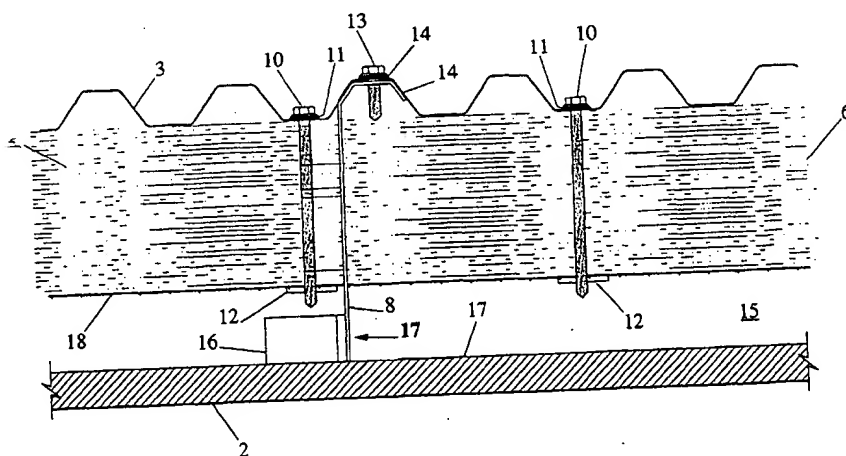
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(54) Title: INSULATION MODULE FOR VESSELS



(57) Abstract

Described is an insulation module (1) for a vessel (2) used in a chemical plant. The module may take the form of a panel having an outer surface layer (3) and an insulation layer (5) secured to the outer surface layer (3). Mounting means (10) extends from the panel (1) and enables mounting of the insulation module (1) on an outer wall (2) of the vessel. An air gap (15) is provided between the insulation layer (3) and the outer vessel wall (2) when the insulation module is mounted (1) on the vessel (2).

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INSULATION MODULE FOR VESSELS

Field of the Invention

The present invention generally relates to insulation technology used in industrial and other applications, and in particular, to an insulation module for insulating a vessel, and a method of installing the insulation module. The present invention will be described with reference to its use on vessels used in chemical plants. It should however be appreciated that other applications of the insulation module are also envisaged.

Background to the Invention

10 In chemical plants, tanks and other vessels holding or carrying materials such as solids, gases or liquids generally need to be maintained within controlled temperature limits for efficient use within the process being conducted within the chemical plant. One way of providing this temperature control is to provide insulation on the vessels and pipes of the plant.

15 The insulation of a chemical plant is however an expensive and time consuming process. In the case of vessels, a commonly used method of installing the insulation is to initially embed a series of pins over the surface of the outer wall of the vessel with each pin extending laterally therefrom. The insulation material can then be supported on the pins, with a sealing washer
20 being provided at the end of each pin to retain the insulation and any retaining mesh in position. An outer metal cladding is then installed over the top of the insulation to provide protection for the insulation.

The current installation process therefore involves a series of steps. It is not, however, always possible to install pins, as for example in the case of
25 thermally relieved vessels. Other means, such as straps, are then required to hold the insulation in position.

Furthermore, because the insulation material generally used is made of fibrous material such as, for example, fibreglass, the insulation of this material can pose a safety risk to the workers on site such that all non-insulation work
30 must cease while the insulation is being installed. This may necessitate working in night environments where the cost of lighting and incidental costs of employment are commensurately higher than during the day.

Furthermore, because the insulation material is installed immediately against the outer wall surface of the vessel, and because the insulation material can retain moisture, this can potentially lead to corrosion problems for the vessel.

5 Summary of the Invention

It is therefore an object of the present invention to avoid at least one of the above-noted disadvantages of existing insulation systems.

With this object in view, according to one aspect of the present invention, there is provided an insulation module for a vessel including

10 a panel having an outer surface layer, and an insulation layer secured to the outer surface layer; and

mounting means extending from the panel for enabling mounting of the insulation module on an outer wall of the vessel, wherein an air gap is provided between the insulation layer and the outer wall of the vessel when the insulation
15 module is mounted relative thereto.

The provision of the air gap leads to a number of advantages:

(a) because the insulation layer is separated from the wall of the vessel by the air gap, this minimises the possibility of corrosion due to the retention of moisture within the insulation layer.

20 (b) the air located within the air gap provides an additional insulation layer. This means that the insulation layer secured to the outer surface layer can be of a reduced thickness.

Furthermore, because the insulation layer is secured to the outer surface layer prior to insulation of the insulation module, the insulation layer can be
25 treated to prevent the release of potentially hazardous fibres therefrom. For example, the insulation layer may be covered by material prior to securing to the outer surface layer. Alternatively, an adhesive paint may be sprayed on the outer surface of the insulation layer to prevent or minimise the release of fibres from that layer prior to securing to the outer surface layer. The Applicant's co-
30 pending Australian Patent Application No. 26034/99 discloses a suitable sealing agent for this application of reducing fibre release.

The outer surface layer is dependent on the requirements of the plant

operator. For example, the outer layer may be a corrugated sheet such as "Spandek" (trademark) or may be a flat sheet. This outer layer can be made of steel or aluminium although other materials are also envisaged.

The insulation layer may be secured to the outer surface layer by
5 securing means. For example, the insulation layer may be retained between the outer surface layer and a support mesh. Fastening means may extend between the outer surface layer through the insulation layer to the supporting mesh. The fastening means may for example be in the form of a fixing screw extending from
10 the outer surface layer and through the insulation layer and the support mesh. A speed clip member may be secured to a free end of each fixing screw to retain the support mesh, and therefore the insulation layer in position against the outer surface layer.

According to another possible arrangement, the insulation layer may be adhered directly to the outer surface layer.

15 The mounting means may include a series of brackets secured to and extending from the outer surface layer towards the vessel wall when the insulation module is in an installed position. Each bracket may include a mounting leg for supporting the panel of the insulation module away from the vessel wall.

20 Vessels used in chemical plants typically have a series of cleats provided about the outer wall of the vessel to allow cladding to be fixed to the outside of the vessel. To this end, the bracket mounting legs may be secured to the cleats when installing each insulation module on the vessel. Each mounting can be bolted to or welded to a respective cleat. Alternatively, where no cleats are
25 provided, the bracket mounting legs may be welded directly to the vessel wall. Alternatively, fastening means may specifically be provided to secure the bracket mounting legs to the vessel wall. For example, a series of thread rod stubs may be welded to the vessel wall. Each bracket mounting leg may include
30 accommodate a respective thread rod stub. A nut may then be screwed onto each thread and stub to hold the bracket, and therefore the insulation module in position.

The insulation layer may be made of a variety of different material and may be of different thickness. For example, rock wool, fibreglass, PIR foam or PUR foam and mixtures thereof could be used for the insulation layer. Fire retardants may be incorporated therein. The present invention is not restricted
5 by the insulation material used in the insulation layer.

The insulation modules may be installed in an abutting or closely adjacent relationship to form a matrix covering at least a substantial portion of the outer wall of the vessel and thereby provide the necessary insulation for that vessel. Insulation may also be provided for conical sections of vessels. The
10 present invention therefore eliminates the need to embed pins within the outer wall of the vessel. Furthermore, the installation procedure is a less time consuming single step process. In addition, maintenance of the installation is facilitated because individual modules can be readily removed and replaced with new modules as so required.

15 According to another aspect of the present invention, there is provided a method of installing insulation on a vessel including mounting a plurality of insulation modules in an abutting or closely adjacent relationship on an outer surface of the vessel, each insulation module including a panel having an outer surface layer, and an insulation layer secured to the outer surface layer, and
20 mounting means extending from the panel for mounting the insulation module on the outer wall of the vessel, wherein the method includes securing the mounting means to the vessel to thereby provide an air gap between the insulation layer and the outer wall of the vessel when the insulation modules are mounted relative thereto.

25 According to yet another aspect of the present invention, there is provided an insulated vessel including a series of insulation modules as described above mounted in an abutting or closely adjacent relationship on an outer surface of the vessel.

Brief Description of the Drawings

30 The various aspects of the invention may be more completely understood from the following description of an example arrangement of the present invention with reference to the accompanying drawings in which:

Figure 1 is a cross-sectional view of an insulation module according to the present invention; and

Figure 2 is a detailed partial cross-sectional view of the insulation module of Figure 1 mounted on a vessel wall.

5 Detailed Description of Preferred Embodiment of the Invention

The insulation module 1 includes a panel having an outer surface layer 3 formed, for example, from at least one sheet of "Spandek" (trade mark). The use of other sheet material is possible depending on client requirements. An insulation layer 5 is secured to the underside of the outer surface layer 3. This
10 insulation layer 5 can be of any one of a number of different materials. For example, the insulation layer 5 can be provided by sheets of rock wool covered by a material layer to prevent the release of fibres from the rock wool. Alternatively, the rock wool could be replaced with fibreglass. In any event, release of fibres may be prevented by sealing the fibrous material stock with a
15 sealing agent, perhaps an acrylic emulsion. Use of sealing agents for this application is described in the Applicant's co-pending Australian Patent Application No. 26034/99, filed 30th April, 1999, the contents of which are hereby incorporated by reference.

The insulation layer 5 is secured to the outer surface layer 3 by means of
20 a series of fixing screws 10 inserted through the outer surface layer 3 and the insulation layer 5. A sealing washer 11 is located between the head of the fixing screw 10 and the outer surface layer 3. A sheet of wire mesh 18 is provided on the opposing side of the insulation layer 5 to help to support that layer 5. An end of the fastening screw 10 extends through the wire mesh 18, and a speed clip
25 12 is attached to the end of each fixing screw 10 to hold the wire mesh 18, and therefore the insulation layer 5 in position.

The insulation module 1 further includes a series of brackets 7. Each bracket 7 includes an upper end 9 shaped to conform with the general profile of the Spandek sheet 3. Adjacent sheets 3 overlap along their respective edge
30 portions. These sheets 3 are then secured to the bracket 7 by means of a further fixing screw 13 extending through the overlapping edge portions of the sheets 3 and the bracket upper end 9. A further sealing washer 14 is located between

the head of the further fixing screw 13 and the Spandek sheets 3.

Each bracket 7 further includes a mounting leg 8 which extends through the insulation layer 5 and the wire mesh 18 and extends beyond the assembled panel 6 of the insulation module 1.

5 A series of cleats 16 are typically provided along the exterior surface 17 of the vessel wall 2. The bracket 7 of the insulation module 1 are spaced along the insulation module 1 and correspond with the spacing of the cleats 16 on the vessel wall 2. The mounting leg 8 of each bracket 7 can then be secured to a respective cleat 16 to install the insulation module 1. The brackets 7 can be
10 welded to or bolted to the cleats 16. Alternatively, where no cleats are provided, then the brackets 7 can be welded to the vessel wall 2.

A series of the insulation modules 1 can be installed in an abutting or closely adjacent relationship over the outer surface 17 of the vessel wall 2 to thereby at least substantially cover the vessel wall and thereby provide the
15 necessary insulation for that vessel. Because the bracket 7 extends beyond the insulation module panel 6, an air gap 15 is provided between the insulation layer 5 and the vessel wall 2. This air gap 15 leads to the advantages described above.

It is also envisaged according to the present invention that the panel 6 of
20 the insulation module 1 be formed from an outer surface layer having an insulation layer bonded directly to the outer surface layer.

Modifications and variations may be made to the present invention or consideration of the disclosure by the skilled reader of this disclosure. Such modifications and variations are considered to fall within the scope of the
25 present invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An insulation module for a vessel including:
a panel having an outer surface layer, and an insulation layer secured to the outer surface layer; and mounting means extending from the panel for enabling mounting of the insulation module on an outer wall of the vessel, wherein an air gap is provided between the insulation layer and the outer wall of the vessel when the insulation module is mounted relative thereto.
2. The insulation module of claim 1 wherein said insulation layer is a fibrous material treated to prevent escape of fibres.
3. The insulation module of claim 1 or 2 wherein said insulation layer is retained between the outer surface layer and a support mesh.
4. The insulation module of claim 3 wherein fastening means extend between the outer surface layer through the insulation layer to the supporting mesh.
5. The insulation module of claim 4 wherein said fastening means is at least one fixing screw.
6. The insulation module of claim 5 wherein a speed clip member is secured to a free end of said at least one fixing screw.
7. The insulation module of any one of the preceding claims wherein the insulation layer is adhered directly to the outer surface layer.
8. The insulation module of any one of the preceding claims wherein said mounting means includes a series of brackets secured to and extending from the outer surface layer towards the vessel wall when the insulation is in an installed position.

9. The insulation module of claim 8 wherein each bracket includes a mounting leg for supporting the panel of the insulation module away from the vessel wall.

10. The insulation module of claim 9 wherein said vessel has a series of cleats provided about the outer wall thereof and said mounting legs of said brackets are secured to said cleats.

11. The insulation module of claim 9 wherein fastening means secure said bracket mounting legs to the vessel wall.

12. The insulation module of claim 11 wherein said fastening means are thread rod stubs and each bracket mounting leg includes at least one laterally extending foot having at least one opening therethrough to accommodate respective thread rod stubs.

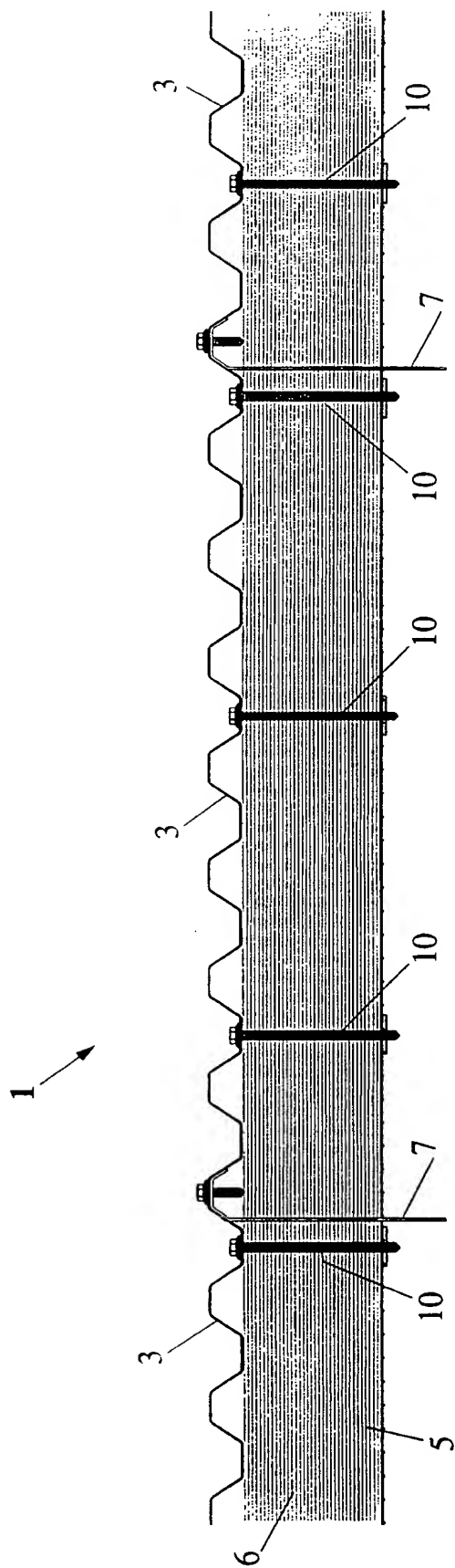
13. The insulation module of any one of the preceding claims wherein said insulation layer is of material selected from the group consisting of rock wool, fibreglass, PIR foam, PUR foam and mixtures thereof.

14. A method of installing insulation on a vessel including mounting a plurality of insulation modules, each as claimed in any one of claims 1 to 13, in an abutting or closely adjacent relationship on an outer surface of the vessel, each insulation module including a panel having an outer surface layer, and an insulation layer secured to the outer surface layer, and mounting means extending from the panel for mounting the insulation module on an outer wall of the vessel, wherein the method includes securing the mounting means to the vessel to thereby provide an air gap between the insulation layer and the outer wall of the vessel when the insulation modules are mounted relative thereto.

15. The method of claim 14 wherein said insulation layer is of fibrous material treated to prevent release of fibres.

16. The method of claim 15 wherein said fibrous material is treated with a sealing agent, optionally an acrylic emulsion.
17. The method of any one of claims 14 to 16 wherein said outer surface of said vessel includes the outer surface of a conical section thereof.
18. A vessel insulated in accordance with the method of any one of claims 14 to 17.

Fig 1.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00562

A. CLASSIFICATION OF SUBJECT MATTER																						
Int Cl ⁶ : F16L 59/12																						
According to International Patent Classification (IPC) or to both national classification and IPC																						
B. FIELDS SEARCHED																						
Minimum documentation searched (classification system followed by classification symbols) IPC:F16L 59/12																						
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU:IPC as above																						
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																				
X	DE, 3906708, A (PARTEK CORP) 6 December 1990 See entire Specification	1,7,8,9,14																				
X	US 4436119, A (SHAHAN ET AL) 13 March 1984 See entire Specification	1,2,7,8,9,14,15																				
X	US 4122640 A (COMMINES ET. AL.) 31 October 1978 See entire Specification	1,7,8,14																				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex																						
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E"</td> <td>earlier application or patent but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E"	earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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Date of the actual completion of the international search 4 August 1999		Date of mailing of the international search report 10 AUG 1999																				
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00562

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 19631291 A (DAMPERS ENGINEERING GmbH) 5 February 1998 See entire Specification	
X	AU 13469/95 A (TRI-FORM AUSTRALIA PTY, LTD.) 31 August 1995 See entire Specification	1,8,9,11,12,14
X	DE 4225448 A (JANICH GmbH & Co) 3 February 1994 See entire Specification	1,14
X	Derwent Abstract Accession No. 85054566/09 Class Q67 SU 1104339 a (ANDLEEV VA) 23 July 1984 See entire Abstract	1,4
X	Derwent Abstract Accession No. H2896C/34 Class Q21 SU 706271 A (ZHDANOVITYAZ HMAH) 31 December 1979 See entire Abstract	1,14
X	Derwent Abstract Accession No. 90-236876/81 Class Q67 SE 8804482 (ABB CARBBN AB) 13 June 1990 See entire Abstract	1,14
X	Derwent Abstract Accession No. 96-114330/12 Class 67 JP 08014483 A (SANYO ELECTRIC CO. LTD) 16 January 1996 See entire Abstract	1,14
A	FR 2613814 A (BERTIN & CIE, S, A) 14 October 1988 See entire Specification	
A	DD 203591 A (FRITZSCHE et al) 26 October 1983 See entire Specification	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU 99/00562

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	4122640	DE	2835061	GB	2003215	JP	54048316

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Applicant's or agent's file reference
P16178 P COO RHB:JAM

IMPORTANT NOTIFICATION

International application No.
AU 99/00562

International filing date
8 July 1999

Priority date
23 July 1998

Applicant
1. BAINS HARDING LIMITED et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.
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For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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in its capacity as elected Office

Date of mailing (day/month/year) 18 February 2000 (18.02.00)	
International application No. PCT/AU99/00562	Applicant's or agent's file reference
International filing date (day/month/year) 08 July 1999 (08.07.99)	Priority date (day/month/year) 23 July 1998 (23.07.98)
Applicant KEENAN, Brian et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
28 January 2000 (28.01.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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PATENT COOPERATION TREATY
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P16178 P COO RHB:JAM	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International application No. AU 99/00562	International filing date (<i>day/month/year</i>) 8 July 1999	Priority Date (<i>day/month/year</i>) 23 July 1998
International Patent Classification (IPC) or national classification and IPC Int. Cl.⁷ F16L 59/12		
Applicant 1. BAINS HARDING LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of **4 sheets**, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of **5 sheet(s)**.

3. This report contains indications relating to the following items:

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| III | <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| IV | <input type="checkbox"/> Lack of unity of invention |
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| VI | <input type="checkbox"/> Certain documents cited |
| VII | <input type="checkbox"/> Certain defects in the international application |
| VIII | <input checked="" type="checkbox"/> Certain observations on the international application |

Date of submission of the demand
28 January 2000

Date of completion of the report
18 December 2000

Name and mailing address of the IPEA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200
WODEN ACT 2606 AUSTRALIA
E-mail address: pct@ipaaustralia.gov.au
Facsimile No. (02) 6285 3929

Authorized Officer

R. WEBER
Telephone No. (02) 6283 2546

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages 1, 3-6, as originally filed,
pages , filed with the demand,
pages 2, 2a, received on 17 July 2000 with the letter of 17 July 2000.
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 7, 7a-9, received on 17 July 2000 with the letter of 17 July 2000.
- ☒ the drawings, pages 1, 2, as originally filed,
pages , filed with the demand,
pages , received on with the letter of .
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of .

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, was on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 3-7, 10, 13, 15-18	YES
	Claims 1, 8, 9, 11, 12, 14	NO
Inventive step (IS)	Claims 10, 17	YES
	Claims 1-9, 11-16, 18	NO
Industrial applicability (IA)	Claims 1-18	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)**NOVELTY (N) Claims 1, 8, 9, 11, 12, 14**

AU 13469/95 A

The above citation discloses all the features of the claims listed above.

This citation is directed to insulating structures per se (the wall of a dwelling being merely one example) and which would include process vessels.

The citation is directed not to a specific field of applications but rather to a desired result and hence a person considering insulating the process vessel would consider this document relevant.

INVENTIVE STEP (IS) Claims 1 to 9, 11 to 16, 18

Claims 1, 8, 9, 11, 12, 14 as above.

Claims 2 to 7, 13, 15, 16, and 18: the features added by these claims amount to common general knowledge and hence do not involve an inventive step.

INDUSTRIAL APPLICABILITY (IA) Claims 1 to 18

All claims are considered to be industrially applicable.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Claim 1 is not clear with regard to the phrase beginning "none of which..." and where the limitation ends. Do the fastening components not only not extend continuously about the periphery but also not space from the outer wall.
2. Claim 1 is not clear with regard to the relationship between the outer surface layer of the panel and the thermal insulation layer and the process vessel. That is on which side of the panel is the thermal insulation and is the panel of the thermal insulation closest to the process vessel.
3. Claim 17 is not clear with regard to the phrase "the outer surface of a conical section thereof" and what this is referring to.

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

15

Applicant's or agent's file reference P16178 P COO RHB:JAM		FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International application No. AU 99/00562	International filing date (day/month/year) 8 July 1999	Priority Date (day/month/year) 23 July 1998	
International Patent Classification (IPC) or national classification and IPC Int. Cl. ⁷ F16L 59/12			
Applicant 1. BAINS HARDING LIMITED et al			

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.		
2.	This REPORT consists of a total of 3 sheets, including this cover sheet.		
	<input checked="" type="checkbox"/>	This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).	
These annexes consist of a total of 5 sheet(s).			
3.	This report contains indications relating to the following items:		
I	<input checked="" type="checkbox"/>	Basis of the report	
II	<input type="checkbox"/>	Priority	
III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	
IV	<input type="checkbox"/>	Lack of unity of invention	
V	<input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	
VI	<input type="checkbox"/>	Certain documents cited	
VII	<input type="checkbox"/>	Certain defects in the international application	
VIII	<input checked="" type="checkbox"/>	Certain observations on the international application	

Date of submission of the demand 28 January 2000	Date of completion of the report 18 December 2000
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer R. WEBER Telephone No. (02) 6283 2546

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description, pages 1, 3-6, as originally filed,
pages , filed with the demand,
pages 2, 2a, received on 17 July 2000 with the letter of 17 July 2000.
- ☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages 7-9 received on 22 August 2000 with the letter of 22 August 2000.
- ☒ the drawings, pages 1, 2, as originally filed,
pages , filed with the demand,
pages , received on with the letter of .
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of .

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, was on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims 1-18	YES
	Claims	NO
Inventive step (IS)	Claims 1-18	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-18	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)**NOVELTY (N) and INVENTIVE STEP (IS) Claims 1-18**

The closest art is found in AU 13469/95 A (Tri-Form) 31 August 1995 wherein is disclosed a method of insulating a structure such that the insulating layer is held at a predetermined distance from the structure thereby allowing the formation of an air-gap between the two. The insulated system so obtained, however, is not one which involves a "process vessel for containing a material to be maintained within controlled temperature limits for use in a process" and the mounting means disclosed in this citation do not "comprise a fastening system of complementary fastening components, none of which extend continuously about a/the periphery of the process vessel".

As a result the invention as claimed in claims 1-18 is considered to be novel and to involve an inventive step in the light of this document.

INDUSTRIAL APPLICABILITY (IA) Claims 1 to 18

All claims are considered to have industrial applicability.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Claim 1 is not clear with regard to the phrase beginning "none of which..." and where the limitation ends. Do the fastening components not only not extend continuously about the periphery but also not space from the outer wall.
2. Claim 1 is not clear with regard to the relationship between the outer surface layer of the panel and the thermal insulation layer and the process vessel. That is on which side of the panel is the thermal insulation and is the panel of the thermal insulation closest to the process vessel.
3. Claim 17 is not clear with regard to the phrase "the outer surface of a conical section there of" and what this is referring to.

Furthermore, because the insulation material is installed immediately against the outer wall surface of the vessel, and because the insulation material can retain moisture, this can potentially lead to corrosion problems for the vessel.

Summary of the Invention

5 It is therefore an object of the present invention to avoid at least one of the above-noted disadvantages of existing insulation systems.

With this object in view, according to one aspect of the present invention, there is provided an insulation module for a process vessel including

an externally mounted pre-fabricated panel having integrally formed therein
10 an outer surface layer, and a thermal insulation layer which opposes a portion of an outer wall of the process vessel; and

mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about a periphery of the process vessel extending from the panel to the vessel for directly mounting
15 the panel at a distance from the outer wall of the process vessel, to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.

The provision of the air gap leads to a number of advantages:

(a) because the insulation layer is separated from the wall of the vessel
20 by the air gap, this minimises the possibility of corrosion due to the retention of moisture within the insulation layer

(b) the air located within the air gap provides an additional insulation layer. This means that the insulation layer secured to the outer surface layer can be of a reduced thickness.

25 Furthermore, because the insulation layer is secured to the outer surface layer prior to insulation of the insulation module, the insulation layer can be treated to prevent the release of potentially hazardous fibres therefrom. For example, the insulation layer may be covered by material prior to securing to the outer surface layer. Alternatively, an adhesive paint may be sprayed on the outer
30 surface of the insulation layer to prevent or minimise the release of fibres from that layer prior to securing to the outer surface layer. The applicant's co-pending

AMENDED SHEET
IPEA/AU

2a

Australian Patent Application No. 26034/99 discloses a suitable sealing agent for this application of reducing fibre release.

The outer surface layer is dependent on the requirements of the plant

AMENDED SHEET
IPEA/AU

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An insulation module for a process vessel for containing a material to be maintained within controlled temperature limits for use in a process including:
an externally mounted pre-fabricated panel having integrally formed therein an outer surface layer and a thermal insulation layer which opposes a portion of the outer wall of the process vessel; and
mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about the periphery of the process vessel, for directly mounting the panel at a distance from the outer wall of said process vessel to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.
2. The insulation module of claim 1 wherein said insulation layer is a fibrous material treated to prevent escape of fibres.
3. The insulation module of claim 1 or 2 wherein said insulation layer is retained between the outer surface layer and a support mesh.
4. The insulation module of claim 3 wherein fastening means extend between the outer surface layer through the insulation layer to the supporting mesh.
5. The insulation module of claim 4 wherein said fastening means is at least one fixing screw.
6. The insulation module of claim 5 wherein a speed clip member is secured to a free end of said at least one fixing screw.
7. The insulation module of any one of the preceding claims wherein the insulation layer is adhered directly to the outer surface layer of said panel.

8. The insulation module of any one of the preceding claims wherein said mounting means includes a series of brackets secured to and extending from the outer surface layer towards the vessel wall when the insulation is in an installed position.

9. The insulation module of claim 8 wherein each bracket includes a mounting leg for supporting the panel of the insulation module away from the vessel wall.

10. The insulation module of claim 9 wherein said vessel has a series of cleats provided about the outer wall thereof and said mounting legs of said brackets are secured to said cleats.

11. The insulation module of claim 9 wherein fastening means secure said bracket mounting legs to the vessel wall.

12. The insulation module of claim 11 wherein said fastening means are thread rod stubs and each bracket mounting leg includes at least one laterally extending foot having at least one opening therethrough to accommodate respective thread rod stubs.

13. The insulation module of any one of the preceding claims wherein said insulation layer is of material selected from the group consisting of rock wool, fibreglass, PIR foam, PUR foam and mixtures thereof.

14. A method of installing insulation on a process vessel for containing a material to be maintained within controlled temperature limits for use in a process including mounting a plurality of insulation modules, each as claimed in any one of claims 1 to 13 in an abutting or closely adjacent relationship on an outer surface of the vessel, each insulation module including a panel having an outer surface layer, and an insulation layer secured to the outer surface layer, and mounting means extending from the panel for mounting the insulation module on

an outer wall of the vessel, wherein the method includes securing the mounting means to the vessel to thereby provide an air gap between the insulation layer and the outer wall of the vessel when the insulation modules are mounted relative thereto.

15. The method of claim 14 wherein said insulation layer is of fibrous material treated to prevent release of fibres.

16. The method of claim 15 wherein said fibrous material is treated with a sealing agent, optionally an acrylic emulsion.

17. The method of any one of claims 14 to 16 wherein said outer surface of said vessel includes the outer surface of a conical section of the vessel.

18. A process vessel insulated in accordance with the method of any one of claims 14 to 17.

DATED this 21st day of August, 2000

BAINS HARDING LIMITED

WATERMARK PATENT & TRADEMARK ATTORNEYS
4TH FLOOR "DURACK CENTRE"
263 ADELAIDE TERRACE
PERTH WA 6000

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 99/00562

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl⁶: F16L 59/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC:F16L 59/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU:IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE, 3906708, A (PARTEK CORP) 6 December 1990 See entire Specification	1,7,8,9,14
X	US 4436119, A (SHAHAN ET AL) 13 March 1984 See entire Specification	1,2,7,8,9,14,15
X	US 4122640 A (COMMINES ET. AL.) 31 October 1978 See entire Specification	1,7,8,14

☒ Further documents are listed in the
continuation of Box C

☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
4 August 1999

Date of mailing of the international search report
10 AUG 1999

Name and mailing address of the ISA/AU
AUSTRALIAN PATENT OFFICE
PO BOX 200
WODEN ACT 2606
AUSTRALIA
Facsimile No.: (02) 6285 3929

Authorized officer

R. WEBER
Telephone No.: (02) 6283 2546

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00562

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 19631291 A (DAMPERS ENGINEERING GmbH) 5 February 1998 See entire Specification	
X	AU 13469/95 A (TRI-FORM AUSTRALIA PTY, LTD.) 31 August 1995 See entire Specification	1,8,9,11,12,14
X	DE 4225448 A (JANICH GmbH & Co) 3 February 1994 See entire Specification	1,14
X	Derwent Abstract Accession No. 85054566/09 Class Q67 SU 1104339 a (ANDLEEV VA) 23 July 1984 See entire Abstract	1,4
X	Derwent Abstract Accession No. H2896C/34 Class Q21 SU 706271 A (ZHDANOVITYAZ HMASH) 31 December 1979 See entire Abstract	1,14
X	Derwent Abstract Accession No. 90-236876/81 Class Q67 SE 8804482 (ABB CARBBN AB) 13 June 1990 See entire Abstract	1,14
X	Derwent Abstract Accession No. 96-114330/12 Class 67 JP 08014483 A (SANYO ELECTRIC CO. LTD) 16 January 1996 See entire Abstract	1,14
A	FR 2613814 A (BERTIN & CIE, S, A) 14 October 1988 See entire Specification	
A	DD 203591 A (FRITZSCHE et al) 26 October 1983 See entire Specification	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU 99/00562

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
US	4122640	DE	2835061
GB	2003215	JP	54048316

END OF ANNEX

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
**WATERMARK PATENT & TRADEMARK
ATTORNEYS**
Locked Bag 5
HAWTHORN VIC 3122
[g3]

PCT

WRITTEN OPINION

(PCT Rule 66)

Applicant's or agent's file reference RHB:JCC		Date of mailing (day/month/year) 24 FEBRUARY 2000
International application No. PCT/AU 99/00562		REPLY DUE within TWO MONTHS from the above date of mailing
International filing date (day/month/year) 08 July 1999	Priority Date (day/month/year) 23 July 1998	
International Patent Classification (IPC) or both national classification and IPC Int. Cl.⁷ F16L 59/12		
Applicant 1. BAINS HARDING LIMITED 2. KEENAN, Brian 3. VUJIC, Milivoj		

1. This written opinion is the **FIRST** drawn by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:

I	<input checked="" type="checkbox"/>	Basis of the opinion
II	<input type="checkbox"/>	Priority
III	<input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	<input type="checkbox"/>	Lack of unity of invention
V	<input checked="" type="checkbox"/>	Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
VI	<input type="checkbox"/>	Certain documents cited
VII	<input type="checkbox"/>	Certain defects in the international application
VIII	<input checked="" type="checkbox"/>	Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: **23 November 2000**

Name and mailing address of the IPEA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200
WODEN ACT 2606 AUSTRALIA
E-mail address: pct@ipaaustralia.gov.au
Facsimile No. (02) 6285 3929

Authorized Officer

R. WEBER
Telephone No. (02) 6283 2546

Basis of the opinion

1. With regard to the elements of the international application:*

- ☒ The international application as originally filed.
- ☐ The description, pages , as originally filed,
 pages , filed with the demand,
 pages , filed with the letter of .
- ☐ the claims, pages , as originally filed,
 pages , as amended under Article 19,
 pages , filed with the demand,
 pages , filed with the letter of .
- ☐ the drawings, pages , as originally filed,
 pages , filed with the demand,
 pages , filed with the letter of .
- ☐ the sequence listing part of the description:
 pages , as originally filed
 pages , filed with the demand
 pages , filed with the letter of .

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ Contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ Furnished subsequently to this Authority in written form.
- ☐ Furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 3,4,5,6,10,13,16,17,18	YES
	Claims 1,2,7,8,9,11,12,14,15	NO
Inventive step (IS)	Claims 10,17	YES
	Claims 1 to 9, 11 to 16, 18	NO
Industrial applicability (IA)	Claims 1 to 18	YES
	Claims	NO

2. Citations and explanations

NOVELTY(N) CLAIMS 1,2,7,8,9,11,12,14,15

DE 3906708, A	CLAIMS 1,7,8,9,14
US 4436119, A	CLAIMS 1,2,7,8,9,14,15
US 4122640, A	CLAIMS 1,7,8,14
AU 13469/95, A	CLAIMS 1,8,9,11,12,14
DE 4225448, A	CLAIMS 1,14
SU 1104339, A	CLAIMS 1,14
SU 706271, A	CLAIMS 1,14
SE 8809482, A	CLAIMS 1,14
JP 08014483, A	CLAIMS 1,14

Each of the above citations explicitly discloses all of the features of the claims listed alongside.

INVENTIVE STEP(IS) CLAIMS 1 TO 9, 11 TO 16, 18

Claims 1,2,7,8,9,11,12,14,15 as above.

Claims 3,4,5,6,13,16,18:

The features added by these claims merely amount to common general knowledge and hence do not involve an inventive step.

INDUSTRIAL APPLICABILITY (IA) CLAIMS 1 TO 18

All claims are considered to be industrially applicable.

Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 17 is not clear with regard to the phrase "the outer surface of a conical section thereof" and what this is referring to.

P1617820

PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

WATERMARK PATENT & TRADEMARK
ATTORNEYS
Locked Bag 5
HAWTHORN VIC 3122

PCT

WRITTEN OPINION

(PCT Rule 66)

Date of mailing
(day/month/year)

16 August 2000

Applicant's or agent's file reference
RHB:JCC

REPLY DUE

within TWO MONTHS
from the above date of mailing

International application No.
PCT/AU99/00562

International filing date (day/month/year)
8 July 1999

Priority Date (day/month/year)
23 July 1998

International Patent Classification (IPC) or both national classification and IPC

Int. Cl. ⁷ F16L 59/12

Applicant

BAINS HARDING LIMITED et al

KEENAN, Brian

1. This written opinion is the **second** drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- | | | |
|------|-------------------------------------|--|
| I | <input checked="" type="checkbox"/> | Basis of the opinion |
| II | <input type="checkbox"/> | Priority |
| III | <input type="checkbox"/> | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| IV | <input type="checkbox"/> | Lack of unity of invention |
| V | <input checked="" type="checkbox"/> | Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement |
| VI | <input type="checkbox"/> | Certain documents cited |
| VII | <input type="checkbox"/> | Certain defects in the international application |
| VIII | <input checked="" type="checkbox"/> | Certain observations on the international application |

3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: **23 November 2000**

Name and mailing address of the IPEA/AU

AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA
E-mail address: pct@ipaustalia.gov.au
Facsimile No. (02) 6285 3929

Authorized Officer

R. WEBER

Telephone No. (02) 6283 2546

Basis of the opinion

1. With regard to the elements of the international application:*
- ☐ the international application as originally filed.
- ☒ the description, pages 1, 3-6, as originally filed,
pages , filed with the demand,
pages 2, 2a, received on 17 July 2000 with the letter of 17 July 2000
- ☒ the claims, pages , as originally filed,
pages , as amended under Article 19,
pages , filed with the demand,
pages 7, 7a-9, received on 17 July 2000 with the letter of 17 July 2000
- ☒ the drawings, pages 1, 2, as originally filed,
pages , filed with the demand,
pages , received on with the letter of
- ☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of
2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:
- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:
- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
4. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.
5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"

WRITTEN OPINION

International application No.

PCT/AU99/00562

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 3 to 7, 10, 13, 15 to 18	YES
	Claims 1, 8, 9, 11, 12, 14	NO
Inventive step (IS)	Claims 10, 17	YES
	Claims 1 to 9, 11 to 16, 18	NO
Industrial applicability (IA)	Claims 1 to 18	YES
	Claims	NO

2. Citations and explanations

NOVELTY (N) Claims 1, 8, 9, 11, 12, 14

AU 13469/95 A

The above citation discloses all the features of the claims listed above.

This citation is directed to insulating structures per se (the wall of a dwelling being merely one example) and which would include process vessels.

The citation is directed not to a specific field of application but rather to a desired result and hence a person considering insulating the process vessel would consider this document relevant.

INVENTIVE STEP (IS) Claims 1 to 9, 11 to 16, 18

Claims 1, 8, 9, 11, 12, 14 as above.

Claims 2 to 7, 13, 15, 16, 18: the features added by these claims amount to common general knowledge and hence do not involve an inventive step.

INDUSTRIAL APPLICABILITY (IA) Claims 1 to 18

All claims are considered to be industrially applicable.

VI. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. Claim 1 is not clear with regard to the phrase beginning "none of which..." and whether the limitation ends. Do the fastening components not only not extend continuously about the periphery but also not space from the outer wall.
2. Claim 1 is not clear with regard to the relationship between the outer surface layer of the panel and the thermal insulation layer and the process vessel. That is on which side of the panel is the thermal insulation and is the panel or the thermal insulation closest to the process vessel.
3. Claim 17 is not clear with regard to the phrase 'the outer surface of a conical section there of' and what this is referring to.

Please reply to Perth office

July 17, 2000

Our Ref: P16178PC00 RHB:JAM

Commissioner of Patents
IP Australia

Dear Sir,

Re: International PCT Application No. PCT/AU99/00562 by
Bains Harding Limited

We refer to the Written Opinion, which issued upon the above application on February 24, 2000, and on which the deadline for response has been extended to July 24, 2000.

Proposed Amendments

Please substitute pages 2 and 7 of the specification with the replacement pages 2, 2a, 7 and 7a enclosed with this letter. Claim 1 is proposed to be amended to further clarify the distinction of that claim from the prior art. Claim 7 is proposed to be amended to clarify that the "outer surface layer" referred to is that of the panel. Both claim amendments are supported by the specification (see page 3, line 21; page 4, lines 1 to 3; page 5, line 27 to page 6, line 3; and Figures 1 and 2 thereof). The amendment to page 2 is consequential upon the claim amendment.

Distinguishing the Claims from the Prior Art

The claims, as amended, are novel and inventive over the prior art.

Nature of the Invention

The invention comprises an insulation module for a process vessel, which includes an externally mounted pre-fabricated panel having an outer surface layer. A thermal insulation layer is secured to the outer surface layer. The panel is pre-fabricated and mounted directly to the process vessel by a simple fastening system of complementary fastening components such as brackets, washers and fixing screws. The panel is so mounted as to leave an air gap between the insulating panel and outer wall of the process vessel.

*Patent and
Trade Mark Attorneys
in Australia
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AU 13469/95

This application is directed to household insulation, a different art from insulation of process vessels. The wall of a dwelling is not analogous to the wall of a process vessel.

DE 4225448

This document is likewise not relevant. The insulation system is refractory in nature being placed on the inside wall of a hot gas duct. This bears no resemblance to the non-refractory externally mounted insulation module of the present invention.

SU 1104339

This reference is likewise not directed to a modular construction of insulation including panels of the kind recited in the claims of the current application. Rather, an insulation jacket is taught which is merely spaced from, and not connected to, the piping. It may also be noted that the claims of this application have also been amended to exclude the possibility that the panel extend around the whole periphery of the process vessel. It may be noted that the shell insulation of the citation is slid over the section of pipe. Such a construction is further distinguished from the present invention by the exclusion of a construction in which the insulation layer opposes all of the outer wall of the process vessel.

SU 706271

This document may be distinguished in two ways. First, a rail cistern is not a process vessel of the kind with which the Applicant is concerned. Second, the jacket is not apparently connected to the outer wall of the inner "cistern". Again, as far as can be seen, the system is not modular in construction and there is no panel which has a surface opposing only portion of the inner cistern outer wall.

SE 8809482

This reference may likewise be distinguished from the claims of the present application. There is no evidence of a modular construction and there is no gap between the insulating layer and the outer wall of a process vessel.

JP 08014483

This application is again not relevant being directed to insulation of a "superlow temperature refrigerator". Magnets 6 would not connect the insulating panel of the present invention to the outer wall of a process vessel in accordance with the present application.

Furthermore, because the insulation material is installed immediately against the outer wall surface of the vessel, and because the insulation material can retain moisture, this can potentially lead to corrosion problems for the vessel.

Summary of the Invention

5 It is therefore an object of the present invention to avoid at least one of the above-noted disadvantages of existing insulation systems.

With this object in view, according to one aspect of the present invention, there is provided an insulation module for a process vessel including

an externally mounted pre-fabricated panel having integrally formed therein
10 an outer surface layer, and a thermal insulation layer which opposes a portion of an outer wall of the process vessel; and

mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about a periphery of the process vessel extending from the panel to the vessel for directly mounting
15 the panel at a distance from the outer wall of the process vessel, to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.

The provision of the air gap leads to a number of advantages:

(a) because the insulation layer is separated from the wall of the vessel
20 by the air gap, this minimises the possibility of corrosion due to the retention of moisture within the insulation layer

(b) the air located within the air gap provides an additional insulation layer. This means that the insulation layer secured to the outer surface layer can be of a reduced thickness.

25 Furthermore, because the insulation layer is secured to the outer surface layer prior to insulation of the insulation module, the insulation layer can be treated to prevent the release of potentially hazardous fibres therefrom. For example, the insulation layer may be covered by material prior to securing to the outer surface layer. Alternatively, an adhesive paint may be sprayed on the outer
30 surface of the insulation layer to prevent or minimise the release of fibres from that layer prior to securing to the outer surface layer. The applicant's co-pending

2a

Australian Patent Application No. 26034/99 discloses a suitable sealing agent for this application of reducing fibre release.

The outer surface layer is dependent on the requirements of the plant

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An insulation module for a process vessel including:
an externally mounted pre-fabricated panel having integrally formed therein an outer surface layer and a thermal insulation layer which opposes a portion of the outer wall of the process vessel; and
mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about the periphery of the process vessel for directly mounting the panel at a distance from the outer wall of said process vessel to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.
2. The insulation module of claim 1 wherein said insulation layer is a fibrous material treated to prevent escape of fibres.
3. The insulation module of claim 1 or 2 wherein said insulation layer is retained between the outer surface layer and a support mesh.
4. The insulation module of claim 3 wherein fastening means extend between the outer surface layer through the insulation layer to the supporting mesh.
5. The insulation module of claim 4 wherein said fastening means is at least one fixing screw.
6. The insulation module of claim 5 wherein a speed clip member is secured to a free end of said at least one fixing screw.
7. The insulation module of any one of the preceding claims wherein the insulation layer is adhered directly to the outer surface layer of said panel.

8. The insulation module of any one of the preceding claims wherein said mounting means includes a series of brackets secured to and extending from the outer surface layer towards the vessel wall when the insulation is in an installed position.

16. The method of claim 15 wherein said fibrous material is treated with a sealing agent, optionally an acrylic emulsion.

17. The method of any one of claims 14 to 16 wherein said outer surface of said vessel includes the outer surface of a conical section thereof.

18. A process vessel insulated in accordance with the method of any one of claims 14 to 17.

DATED this 17th day of July 2000

BAINS HARDING LIMITED

WATERMARK PATENT & TRADEMARK ATTORNEYS
4TH FLOOR DURACK CENTRE
263 ADELAIDE TERRACE
PERTH WA 6000

Please reply to Perth office

August 21, 2000

Our Ref: P16178PC00 RHB:JAH

Commissioner of Patents
IP Australia

Dear Sir,

Re: International PCT Application No. PCT/AU99/00562 by
Bains Harding Limited

We refer to the Written Opinion which issued upon the above application on 16 August 2000.

Please find enclosed a revised statement of claims which addresses the clarity issues raised at paragraph VIII. In addition, further recitation of the process vessel – as supported by the description at page 1, lines 10 to 14 – has been inserted into independent claims 1 and 14.

The Reference – AU 13497/95

This application is entitled "Method of Insulating Structures" but following the title, there is a rapid departure in philosophy of insulation in the present case as compared with the reference.

The reference confines its disclosure by particular reference to the "insulation of walls of dwellings or structures" (see page 2, lines 2 to 7). Then it is said, at page 2, lines 12 to 15:

"A particular problem exists in that regard in relation to buildings having walls constructed of concrete, brick, stone or other masonry material. With such dwellings there is a difficulty in securing insulation to a surface of a wall, for example".

Process vessels may be completely distinguished from such structures. Accordingly, an important distinction between the amended claims and the reference is further enlivened by the requirement that the process vessel contain a material to be maintained within controlled temperature limits for use in a process. This is nowhere taught in the reference and so novelty is conferred on all claims.

.../2

**Patent and
Trade Mark Attorneys
in Australia
and New Zealand
Established 1859**

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As to inventive step, one skilled in the art of insulating process vessels would not refer to prior art concerned with the problem of connecting insulation to masonry of dwellings. Process vessel insulation is a discrete art which may be totally distinguished from domestic insulation. This distinction is further emphasised by further recitation of the nature of a process vessel in the claims.

Favourable reconsideration of the application is respectfully requested.

Yours respectfully,
WATERMARK

Richard H. Baddeley

Enc.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An insulation module for a process vessel for containing a material to be maintained within controlled temperature limits for use in a process including:
an externally mounted pre-fabricated panel having integrally formed therein an outer surface layer and a thermal insulation layer which opposes a portion of the outer wall of the process vessel; and
mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about the periphery of the process vessel, for directly mounting the panel at a distance from the outer wall of said process vessel to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.
2. The insulation module of claim 1 wherein said insulation layer is a fibrous material treated to prevent escape of fibres.
3. The insulation module of claim 1 or 2 wherein said insulation layer is retained between the outer surface layer and a support mesh.
4. The insulation module of claim 3 wherein fastening means extend between the outer surface layer through the insulation layer to the supporting mesh.
5. The insulation module of claim 4 wherein said fastening means is at least one fixing screw.
6. The insulation module of claim 5 wherein a speed clip member is secured to a free end of said at least one fixing screw.
7. The insulation module of any one of the preceding claims wherein the insulation layer is adhered directly to the outer surface layer of said panel.

8. The insulation module of any one of the preceding claims wherein said mounting means includes a series of brackets secured to and extending from the outer surface layer towards the vessel wall when the insulation is in an installed position.

9. The insulation module of claim 8 wherein each bracket includes a mounting leg for supporting the panel of the insulation module away from the vessel wall.

10. The insulation module of claim 9 wherein said vessel has a series of cleats provided about the outer wall thereof and said mounting legs of said brackets are secured to said cleats.

11. The insulation module of claim 9 wherein fastening means secure said bracket mounting legs to the vessel wall.

12. The insulation module of claim 11 wherein said fastening means are thread rod stubs and each bracket mounting leg includes at least one laterally extending foot having at least one opening therethrough to accommodate respective thread rod stubs.

13. The insulation module of any one of the preceding claims wherein said insulation layer is of material selected from the group consisting of rock wool, fibreglass, PIR foam, PUR foam and mixtures thereof.

14. A method of installing insulation on a process vessel for containing a material to be maintained within controlled temperature limits for use in a process including mounting a plurality of insulation modules, each as claimed in any one of claims 1 to 13 in an abutting or closely adjacent relationship on an outer surface of the vessel, each insulation module including a panel having an outer surface layer, and an insulation layer secured to the outer surface layer, and

mounting means extending from the panel for mounting the insulation module on an outer wall of the vessel, wherein the method includes securing the mounting means to the vessel to thereby provide an air gap between the insulation layer and the outer wall of the vessel when the insulation modules are mounted relative thereto.

15. The method of claim 14 wherein said insulation layer is of fibrous material treated to prevent release of fibres.

16. The method of claim 15 wherein said fibrous material is treated with a sealing agent, optionally an acrylic emulsion.

17. The method of any one of claims 14 to 16 wherein said outer surface of said vessel includes the outer surface of a conical section of the vessel.

18. A process vessel insulated in accordance with the method of any one of claims 14 to 17.

Furthermore, because the insulation material is installed immediately against the outer wall surface of the vessel, and because the insulation material can retain moisture, this can potentially lead to corrosion problems for the vessel.

Summary of the Invention

5 It is therefore an object of the present invention to avoid at least one of the above-noted disadvantages of existing insulation systems.

With this object in view, according to one aspect of the present invention, there is provided an insulation module for a process vessel including

an externally mounted pre-fabricated panel having integrally formed therein
10 an outer surface layer, and a thermal insulation layer which opposes a portion of an outer wall of the process vessel; and

mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about a periphery of the process vessel extending from the panel to the vessel for directly mounting
15 the panel at a distance from the outer wall of the process vessel, to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.

The provision of the air gap leads to a number of advantages:

(a) because the insulation layer is separated from the wall of the vessel
20 by the air gap, this minimises the possibility of corrosion due to the retention of moisture within the insulation layer

(b) the air located within the air gap provides an additional insulation layer. This means that the insulation layer secured to the outer surface layer can be of a reduced thickness.

25 Furthermore, because the insulation layer is secured to the outer surface layer prior to insulation of the insulation module, the insulation layer can be treated to prevent the release of potentially hazardous fibres therefrom. For example, the insulation layer may be covered by material prior to securing to the outer surface layer. Alternatively, an adhesive paint may be sprayed on the outer
30 surface of the insulation layer to prevent or minimise the release of fibres from that layer prior to securing to the outer surface layer. The applicant's co-pending

2a

Australian Patent Application No. 26034/99 discloses a suitable sealing agent for this application of reducing fibre release.

The outer surface layer is dependent on the requirements of the plant

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

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mounting means comprising a fastening system of complementary fastening components, none of which extend continuously about the periphery of the process vessel for directly mounting the panel at a distance from the outer wall of said process vessel to define an air gap between the panel and the outer wall of the process vessel when the insulation module is mounted relative thereto.
2. The insulation module of claim 1 wherein said insulation layer is a fibrous material treated to prevent escape of fibres.
3. The insulation module of claim 1 or 2 wherein said insulation layer is retained between the outer surface layer and a support mesh.
4. The insulation module of claim 3 wherein fastening means extend between the outer surface layer through the insulation layer to the supporting mesh.
5. The insulation module of claim 4 wherein said fastening means is at least one fixing screw.
6. The insulation module of claim 5 wherein a speed clip member is secured to a free end of said at least one fixing screw.
7. The insulation module of any one of the preceding claims wherein the insulation layer is adhered directly to the outer surface layer of said panel.

7a

8. The insulation module of any one of the preceding claims wherein said mounting means includes a series of brackets secured to and extending from the outer surface layer towards the vessel wall when the insulation is in an installed position.

AMENDED SHEET
IPE/AU

16. The method of claim 15 wherein said fibrous material is treated with a sealing agent, optionally an acrylic emulsion.

17. The method of any one of claims 14 to 16 wherein said outer surface of said vessel includes the outer surface of a conical section thereof.

18. A process vessel insulated in accordance with the method of any one of claims 14 to 17.

DATED this 17th day of July 2000

BAINS HARDING LIMITED

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AMENDED SHEET
IPEA/AU